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Kao et al.

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(54) **PNEUMATICALLY OPERATED OPENER DEVICE**

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B67B 7/08 (2006.01)

(52) **U.S. Cl.**
CPC ***B67B 7/08*** (2013.01)

(58) **Field of Classification Search**
CPC B67B 7/182; B67B 7/08; B67B 7/04; B67B 7/0441; B67B 3/26
See application file for complete search history.

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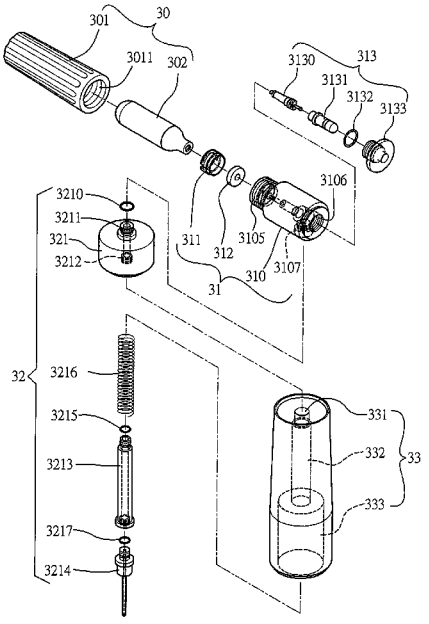
(57) **ABSTRACT**

A pneumatically operated opener device includes a holding unit, an air valve unit, an air injection unit, and a mounting member. The holding unit includes a hollow grip and a high pressure nitrogen bottle. The air valve unit includes a valve seat and a compressed nozzle module. The air injection unit includes a hollow air duct, a hollow push rod, and an air injecting needle. The mounting member has a through hole and a hollow slot, and the hollow push rod of the air injection unit is extended through the through hole of the mounting member. Thus, the cork is pushed upward by the thrust force of nitrogen from the high pressure nitrogen bottle and is detached from the wine bottle smoothly so that the cork will not be broken and will not produce chips during the opening process.

4 Claims, 16 Drawing Sheets



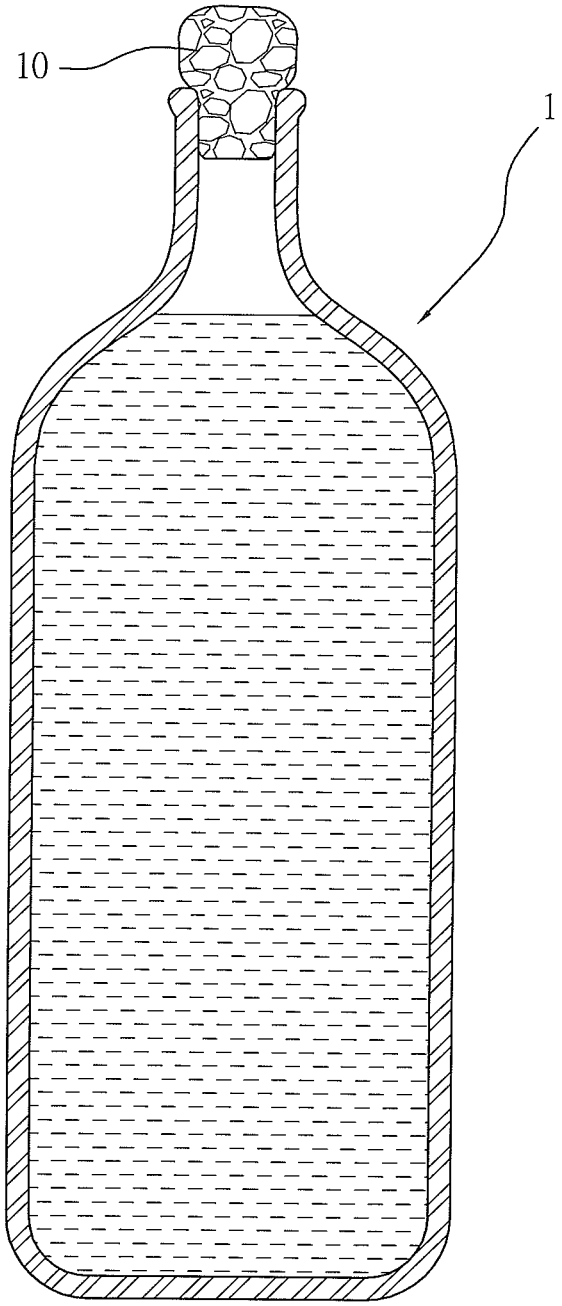


FIG. 1
PRIOR ART

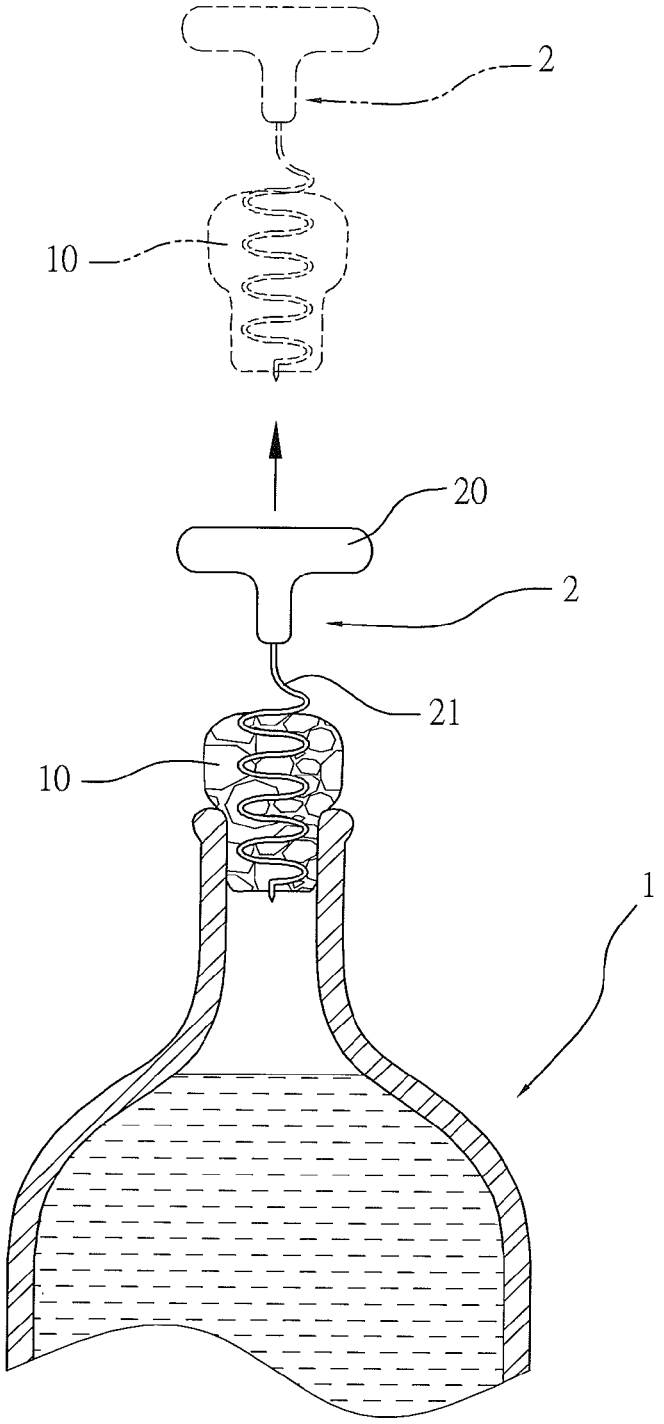


FIG. 2
PRIOR ART

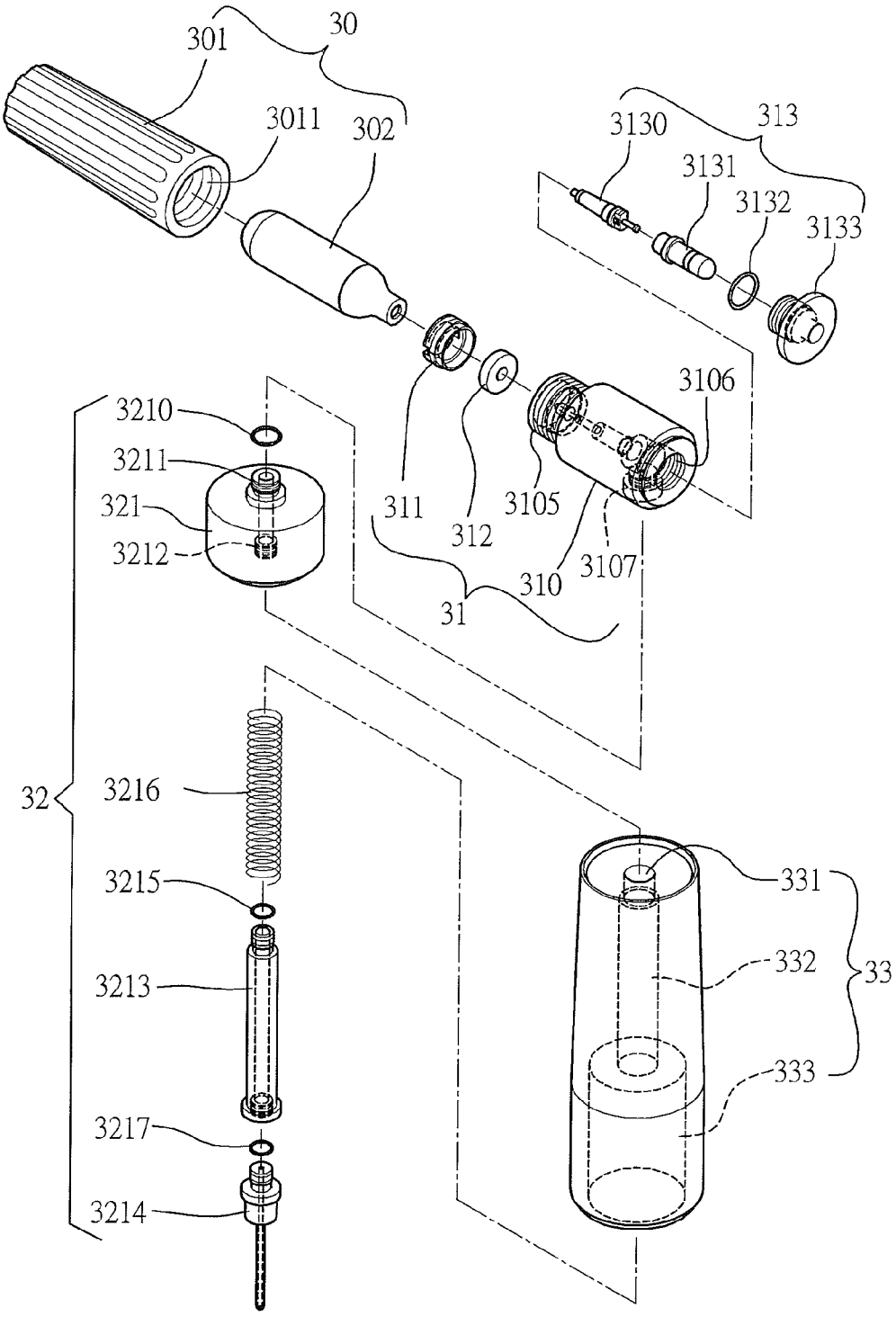
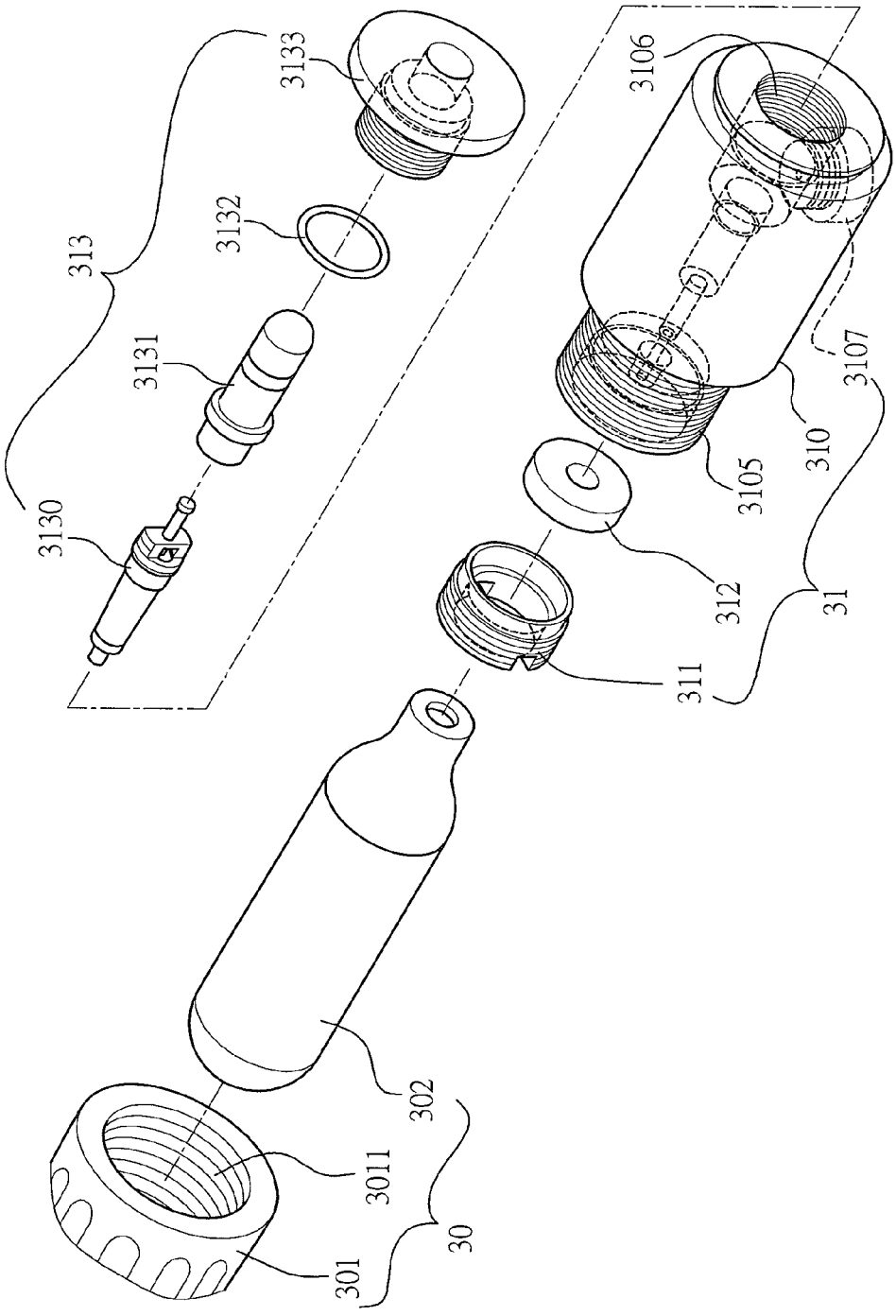

301
30
3011
302
3130
313
3131
3132
3133
3106
3210
3211
321
3212
311
312
3105
3107
310
31
32
3216
3215
3213
3217
3214
331
332
33
333

FIG. 3


313
3130
3131
3132
3133
3106
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310
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30
301
3011
302

FIG.4

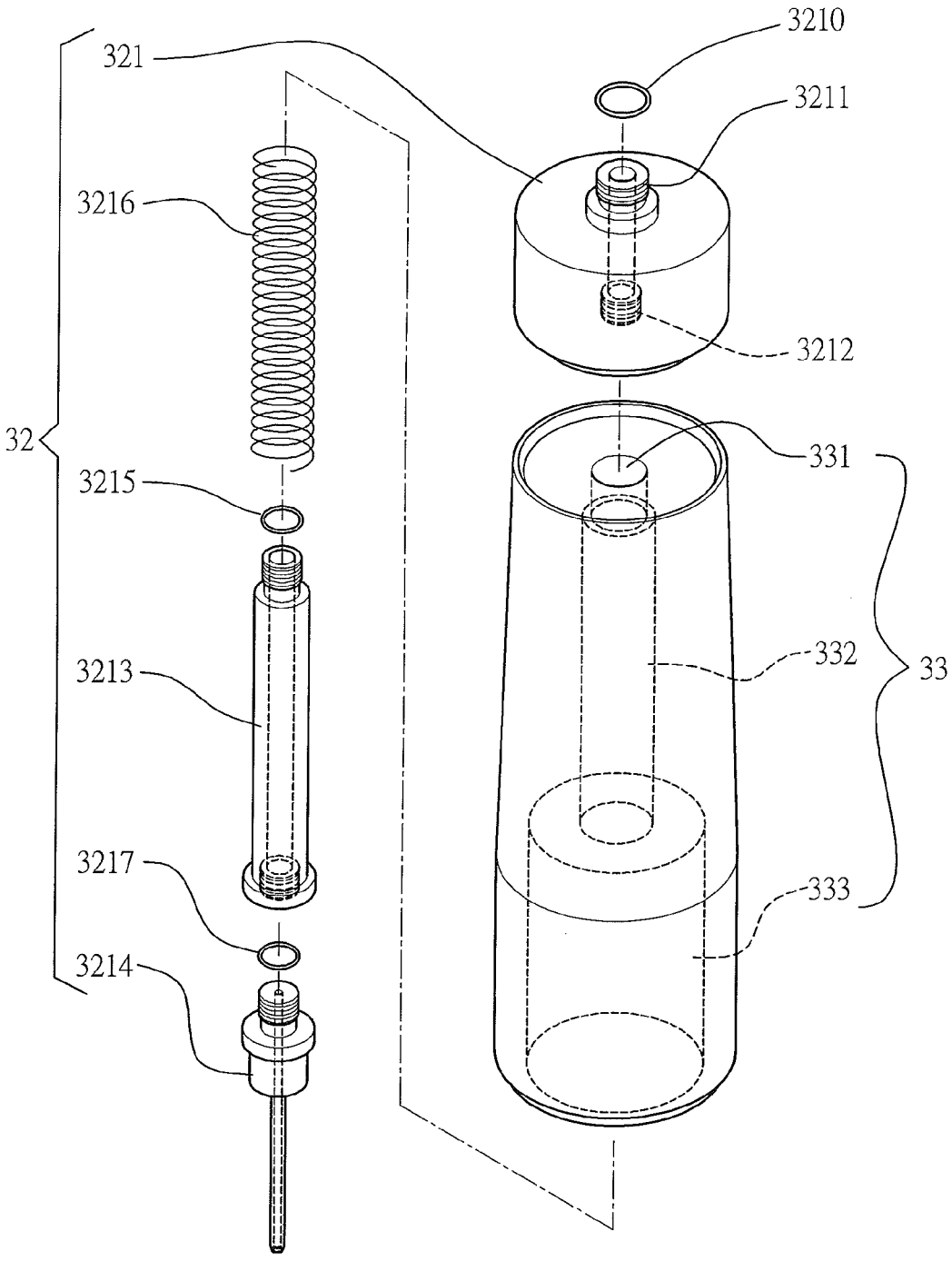

FIG. 5

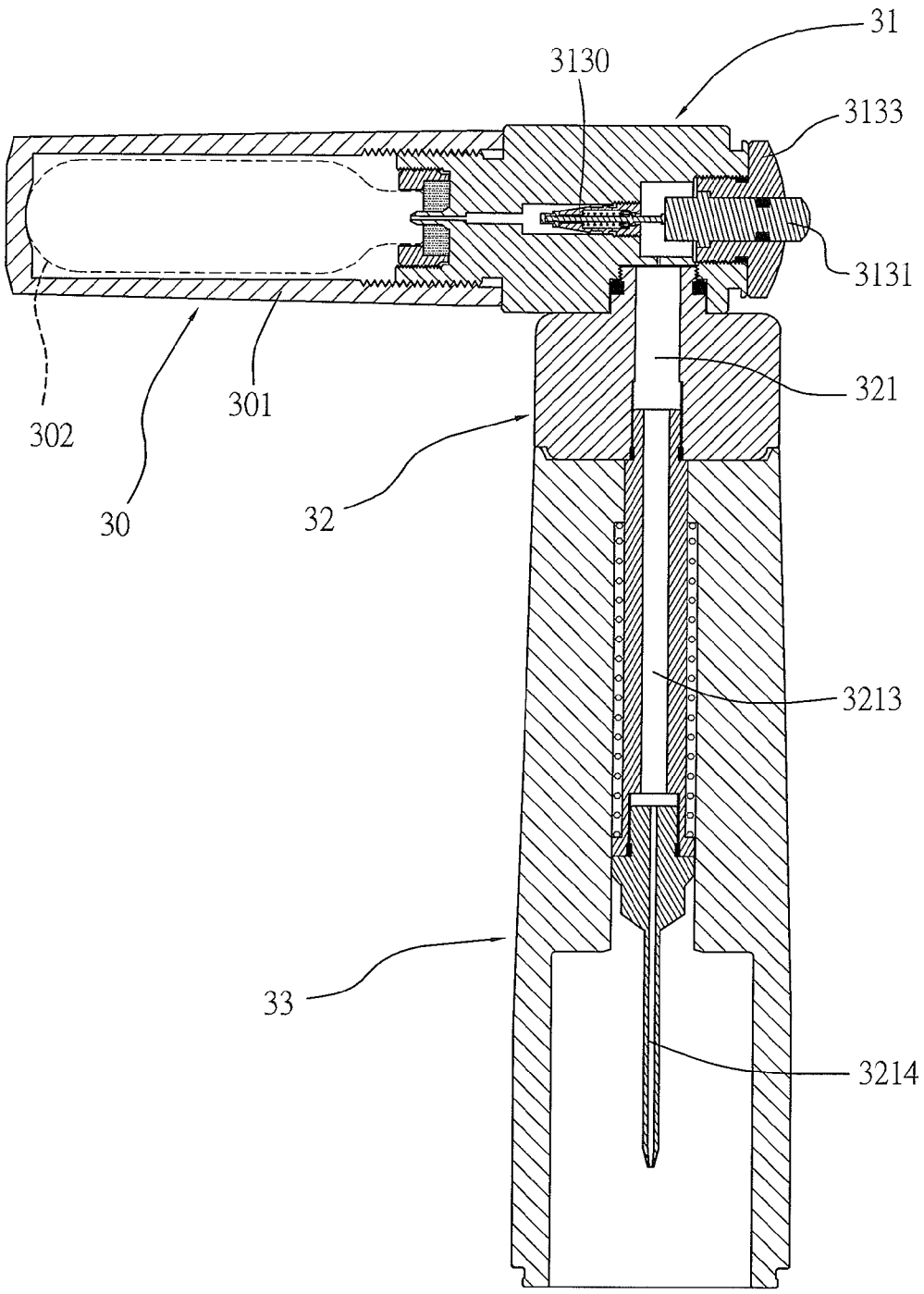

FIG. 6

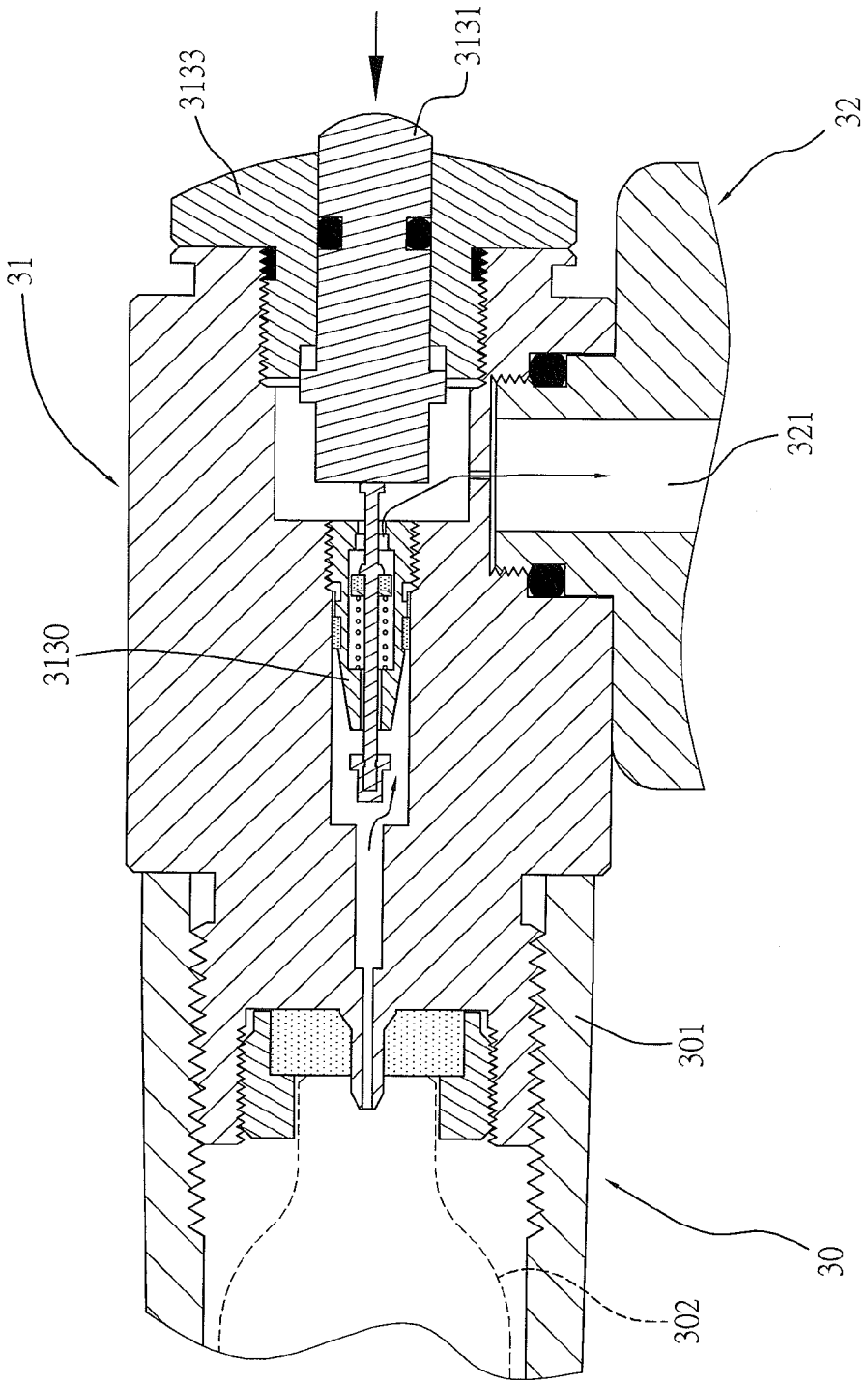

FIG. 7

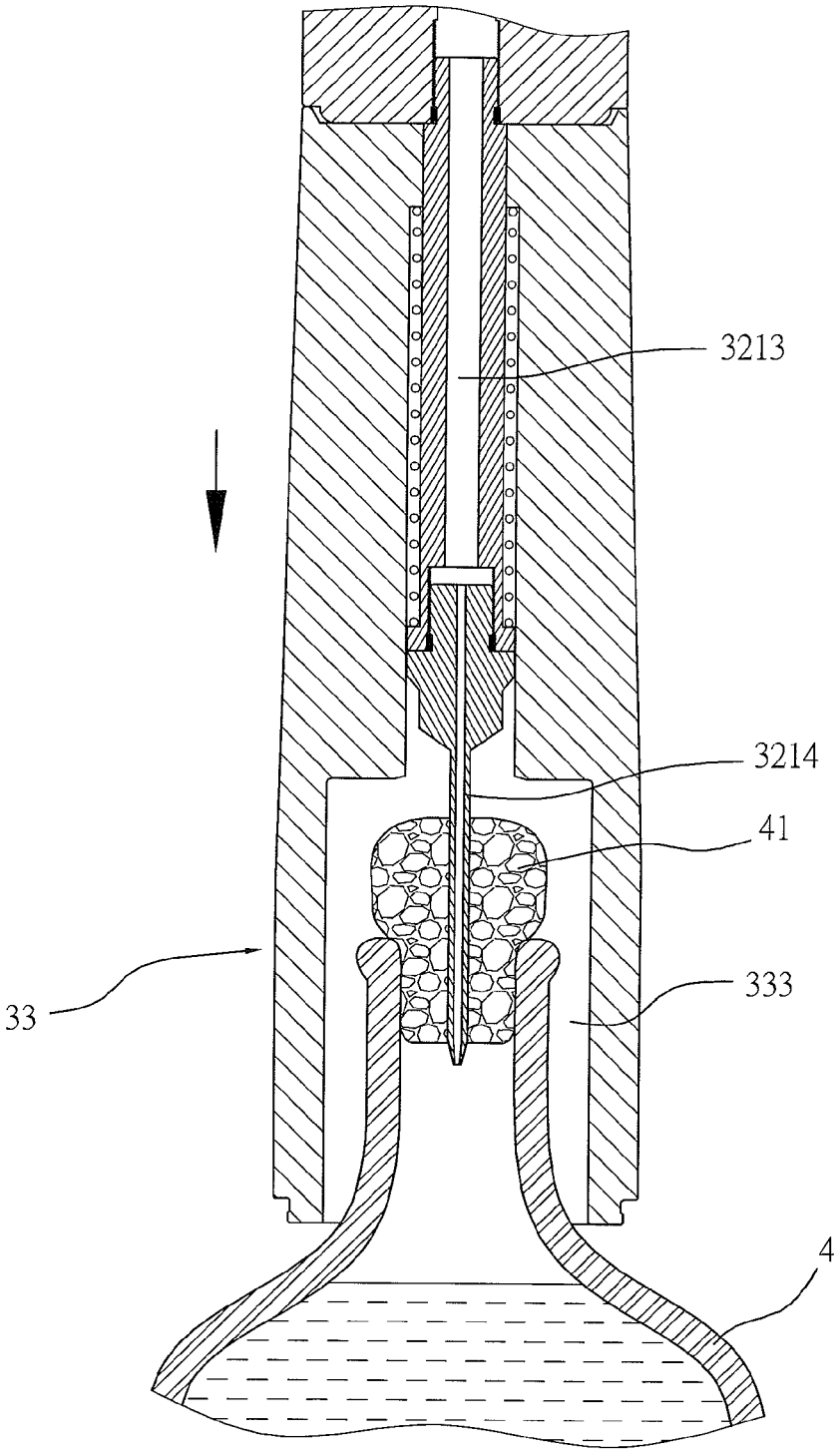

FIG. 8

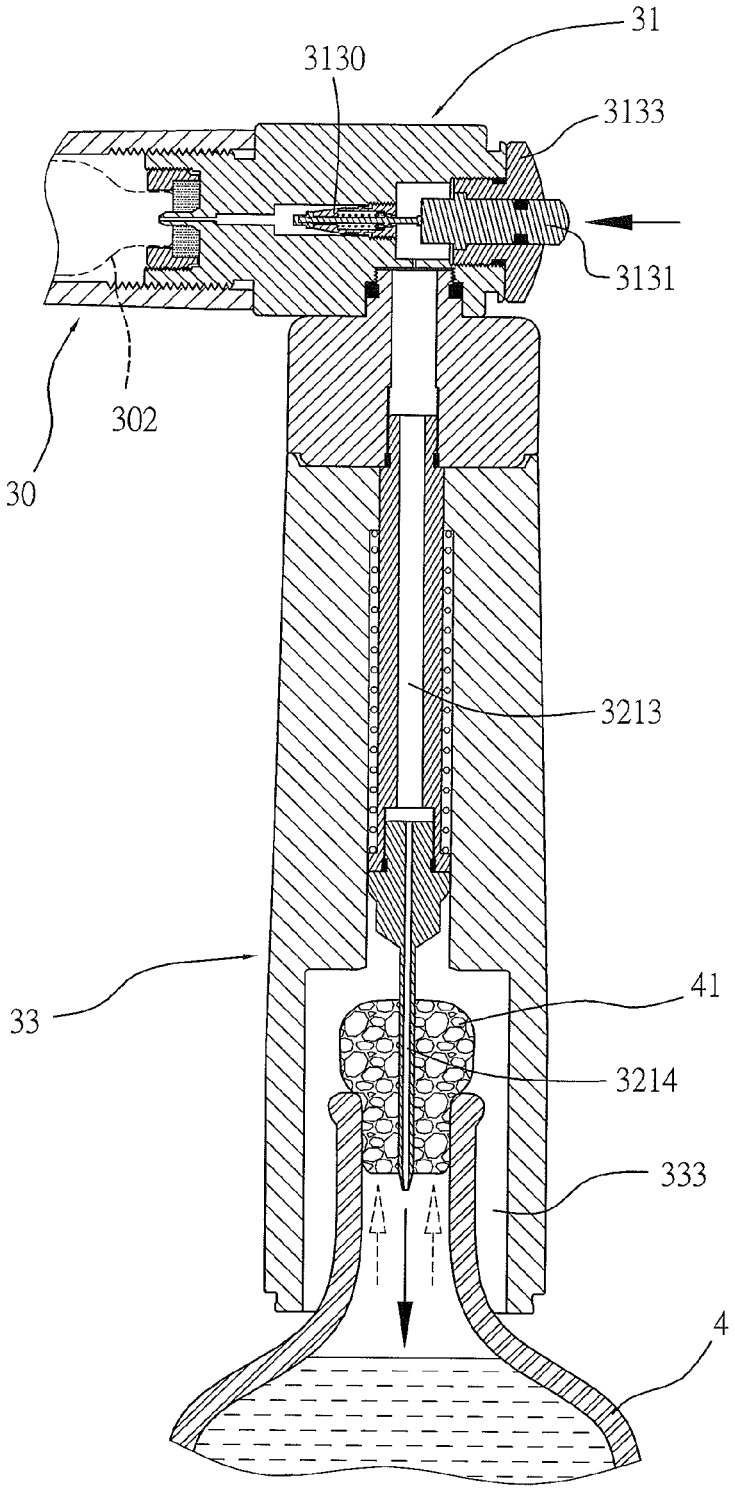

FIG. 9

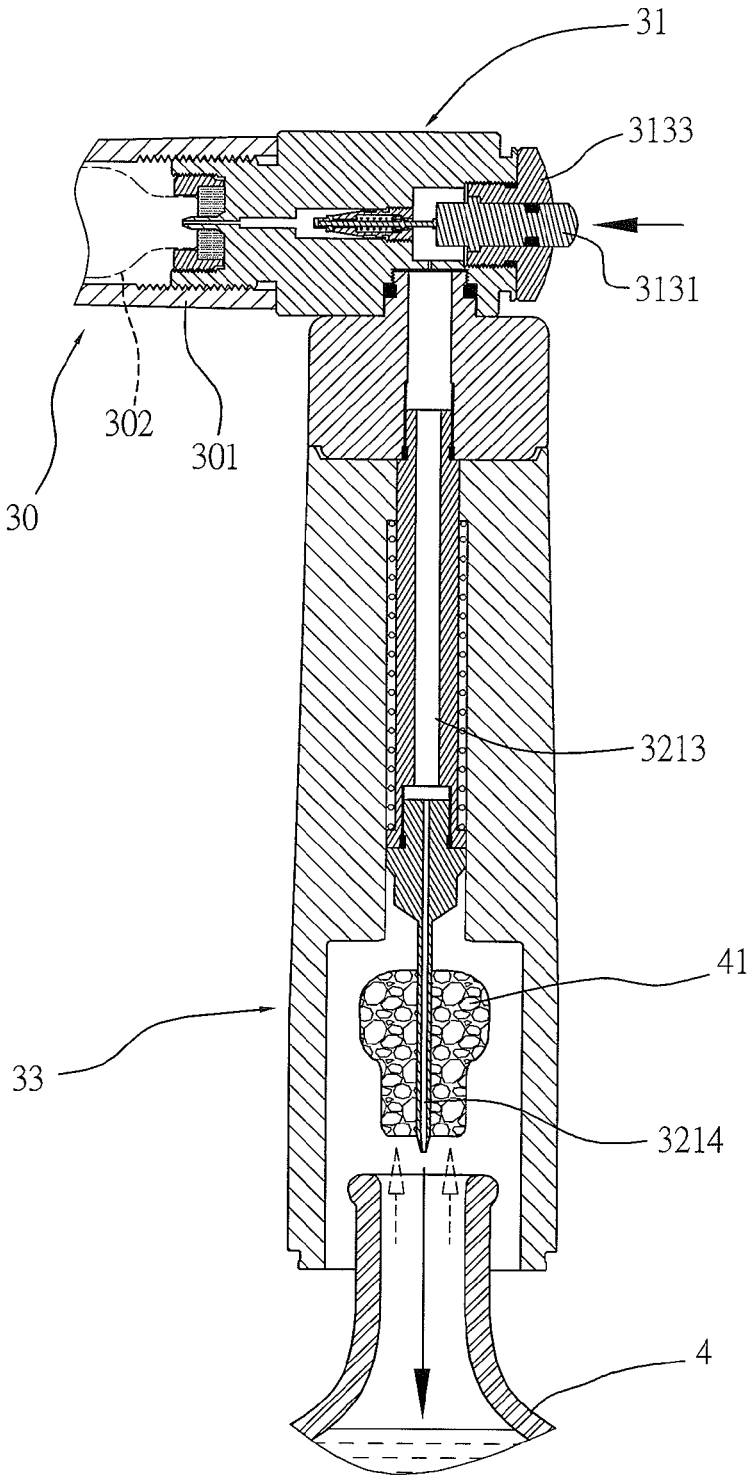

FIG. 10

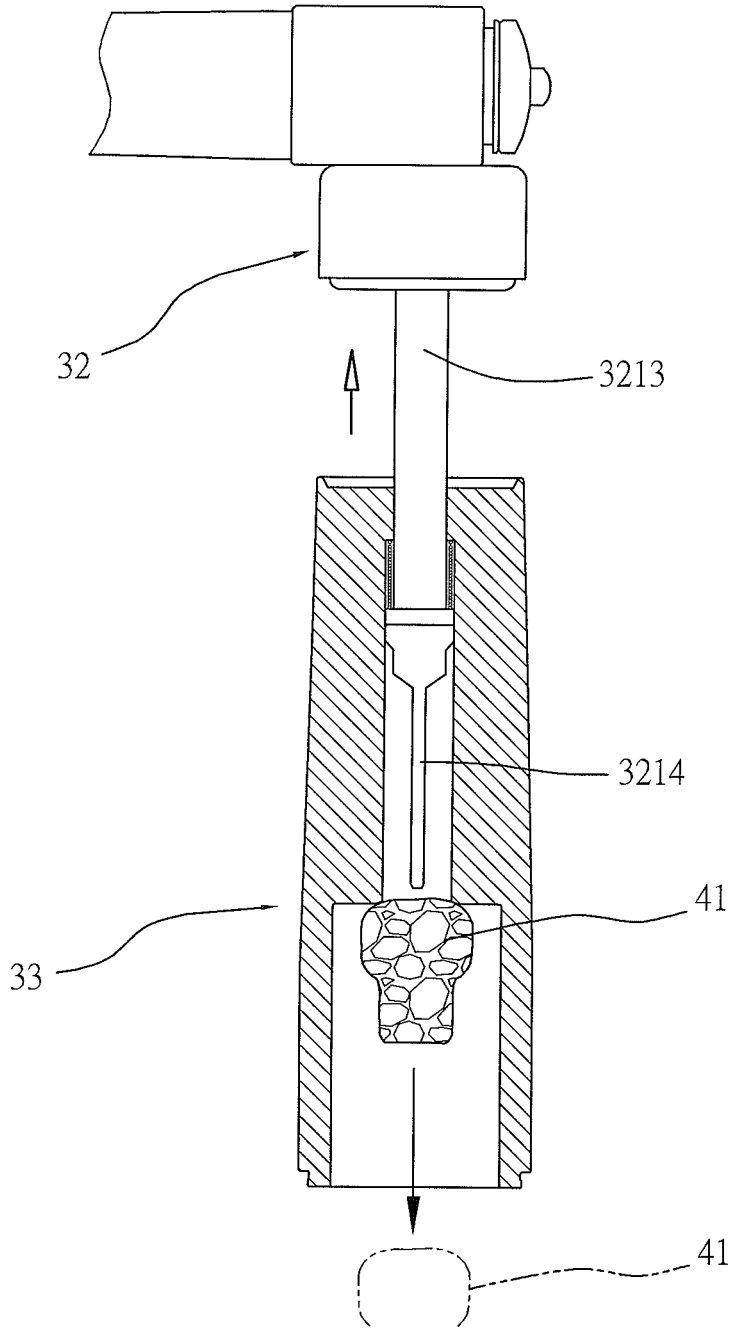

FIG. 11

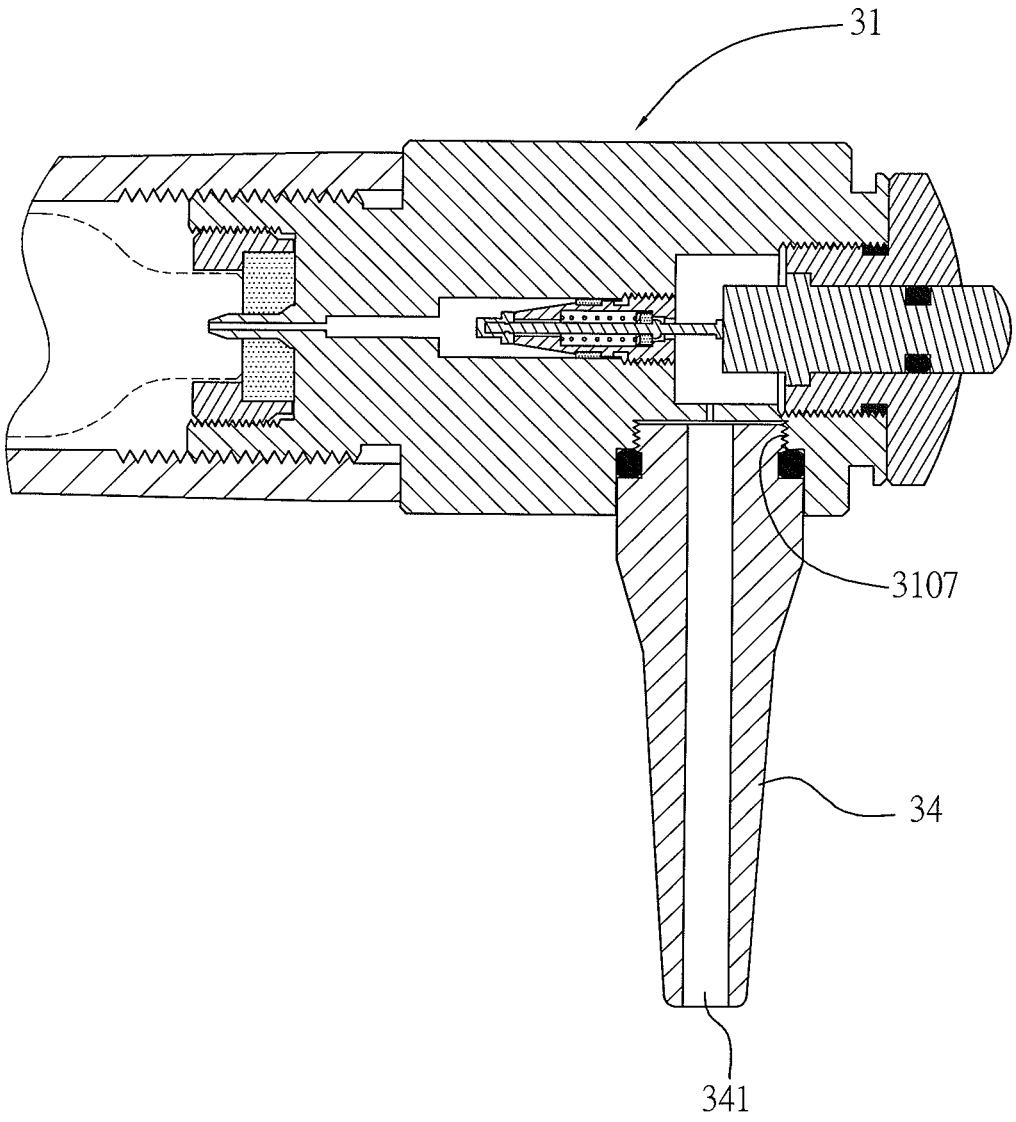

FIG. 12

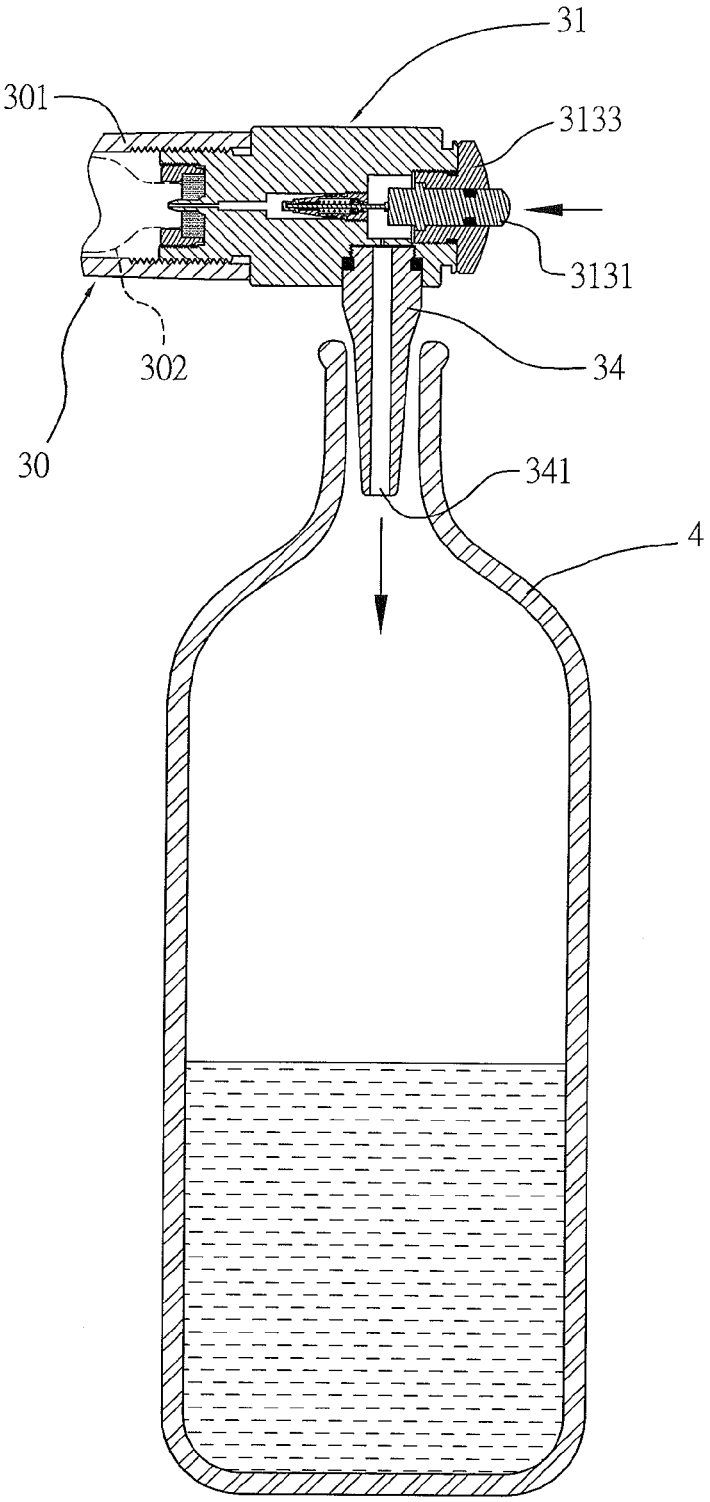

FIG. 13

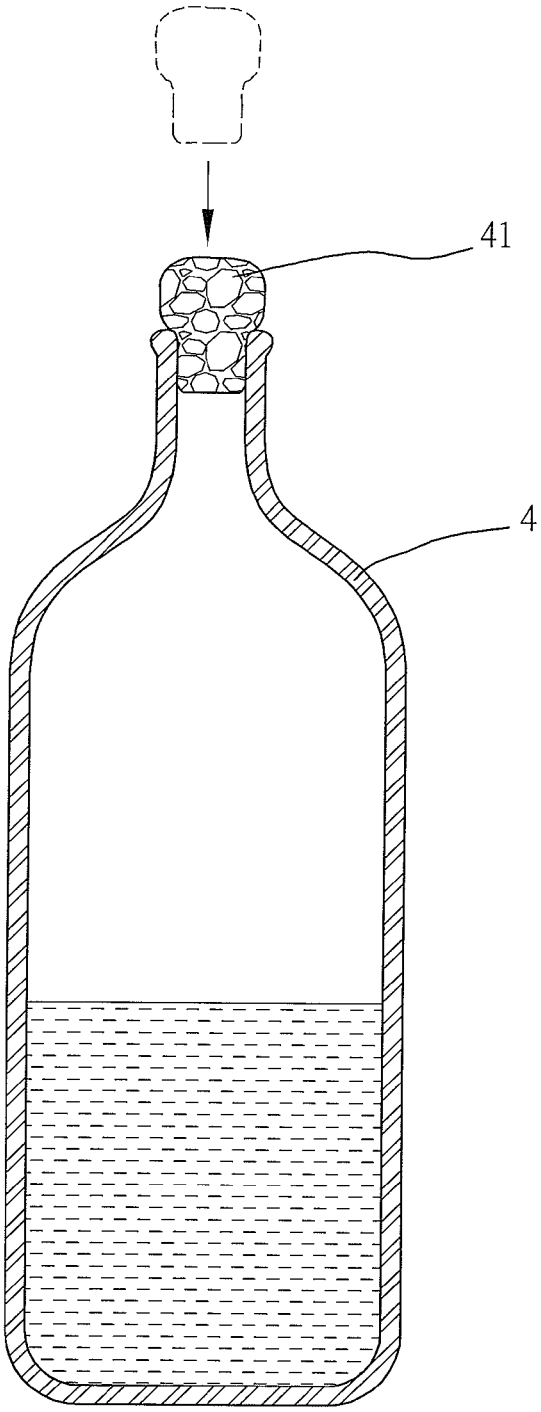

FIG. 14

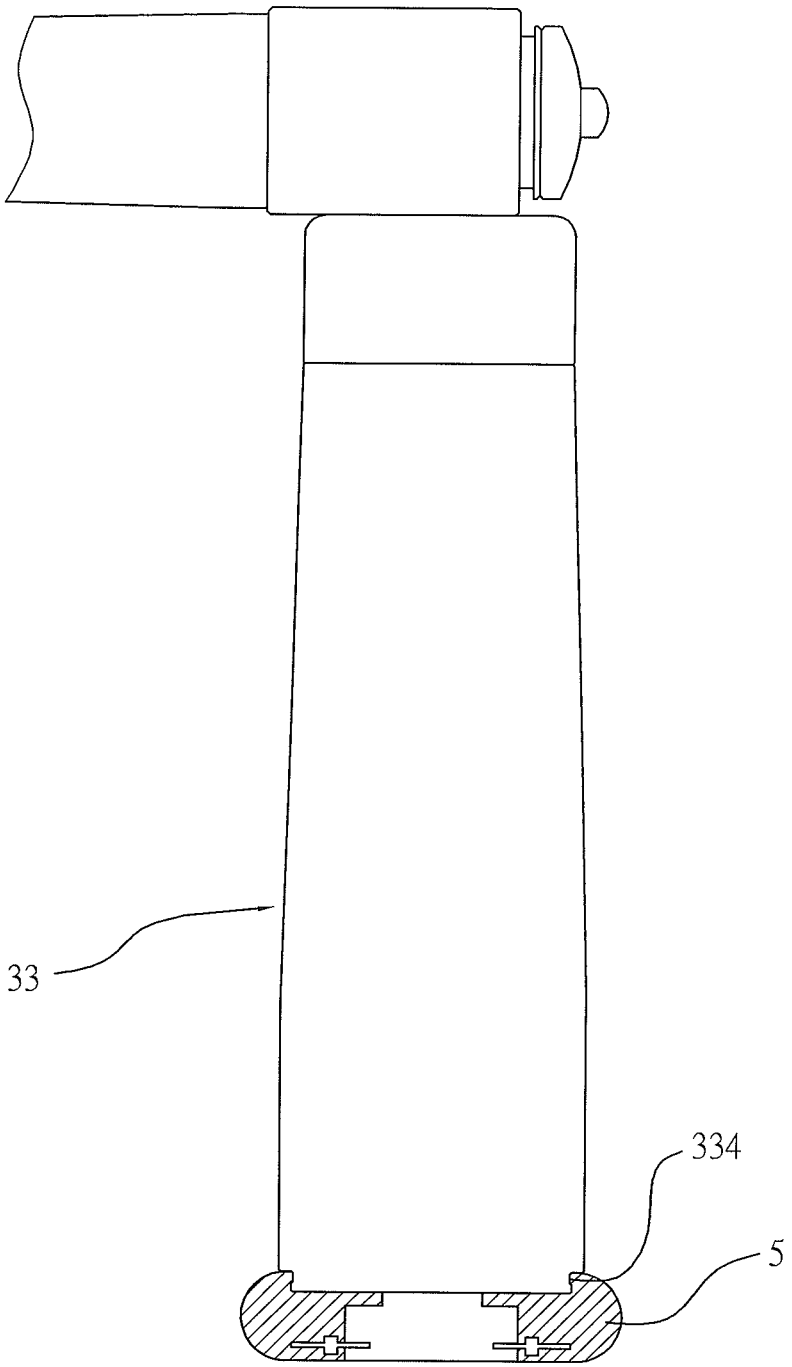

FIG. 15

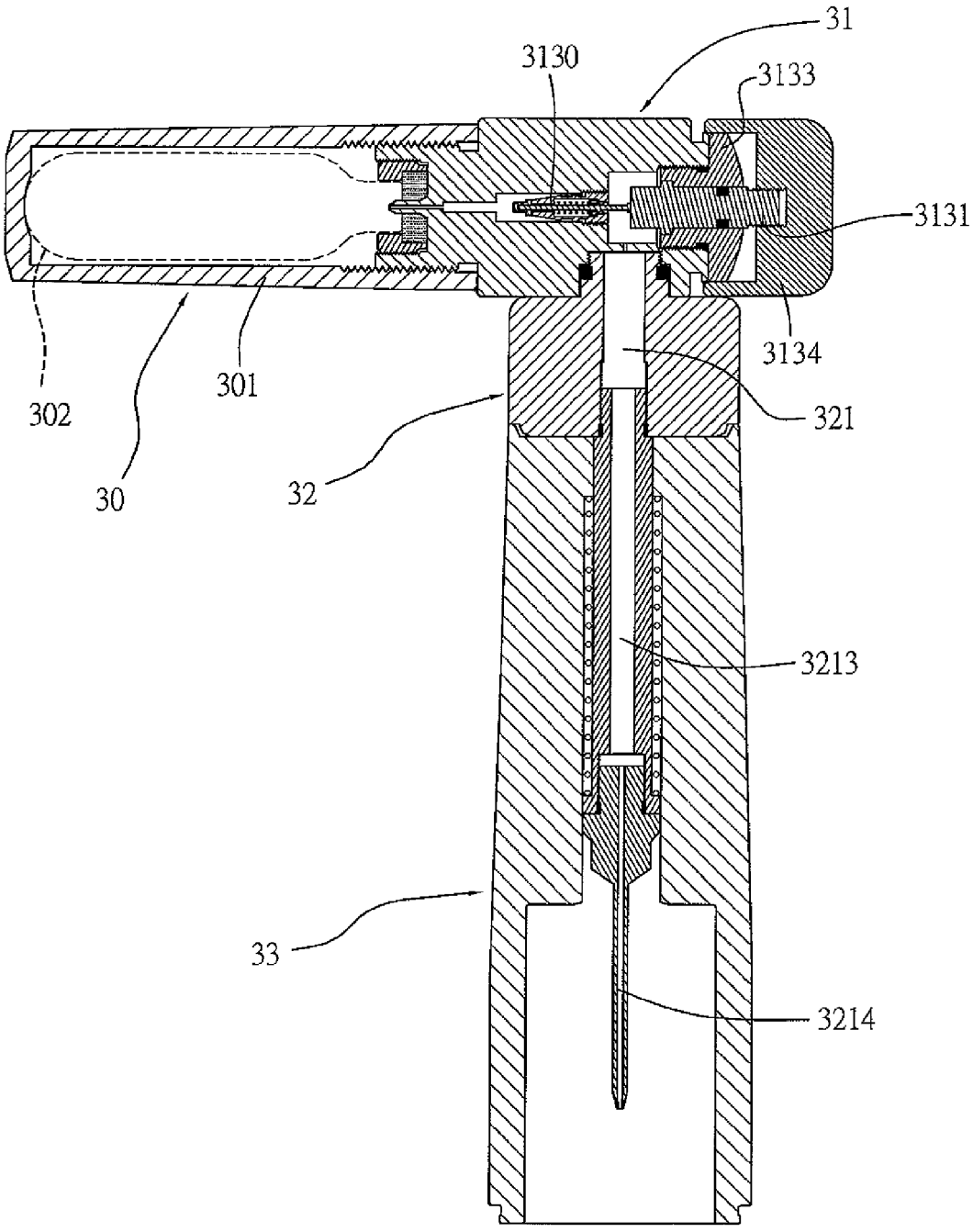

FIG. 16

PNEUMATICALLY OPERATED OPENER DEVICE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an opener and, more particularly, to a pneumatically operated opener device.

2. Description of the Related Art

A conventional opener (or corkscrew) **2** in accordance with the prior art shown in FIGS. **1** and **2** is used to open a wine bottle **1** and comprises a grip portion **20** and a screw portion **21**. In operation, the screw portion **21** is rotated and screwed into the cork **10** of the wine bottle **1**. Then, the grip portion **20** is pulled upward by the user to pull and remove the cork **10** from the wine bottle **1** so as to open the wine bottle **1**. However, when the cork **10** is too weak to withstand the larger force applied by the user, the cork **10** is easily deformed or broken, thereby failing the opener **2**. In addition, the cork **10** cannot be reused when it is broken, so that the cork **10** cannot cover the wine bottle **1** again. Further, the cork **10** easily produces chips due to an excessive force during the opening process so that the chips of the cork **10** easily fall into the wine bottle **1**.

BRIEF SUMMARY OF THE INVENTION

In accordance with the present invention, there is provided a pneumatically operated opener device comprising a holding unit, an air valve unit, an air injection unit, and a mounting member. The holding unit includes a hollow grip and a high pressure nitrogen bottle mounted in the hollow grip. The air valve unit includes a valve seat and a compressed nozzle module mounted on the valve seat. The air injection unit includes a hollow air duct, a hollow push rod mounted on a lower end of the hollow air duct, and an air injecting needle mounted on a lower end of the hollow push rod. The mounting member is a cylindrical sleeve. The mounting member has an interior provided with a through hole, and the hollow push rod of the air injection unit is extended through the through hole of the mounting member and connected with the hollow air duct. The mounting member has a lower end provided with a hollow slot.

Preferably, the high pressure nitrogen bottle is located outside of the hollow grip.

Preferably, the mounting member is a triangular cylindrical sleeve, a quadrangular cylindrical sleeve or a polygonal sleeve.

Preferably, the pneumatically operated opener device further comprises a gas injection tube connected with the valve seat of the air valve unit.

According to the primary advantage of the present invention, the cork is pushed upward by the thrust force of the nitrogen from the high pressure nitrogen bottle and is detached from the wine bottle smoothly so that the cork will not be deformed or broken and will not produce chips during the opening process to prevent the chips from falling into the wine bottle.

According to another advantage of the present invention, the air injecting needle is received in the hollow slot of the mounting member when not in use to prevent the air injecting needle from injuring or hurting the user unintentionally.

According to a further advantage of the present invention, the nitrogen isolates and prevents the liquid in the wine bottle from touching oxygen in the air so as to enhance the storage life of the wine.

Further benefits and advantages of the present invention will become apparent after a careful reading of the detailed description with appropriate reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

FIG. **1** is a front cross-sectional view of a conventional wine bottle in accordance with the prior art.

FIG. **2** is a front cross-sectional view of a conventional opener for the wine bottle in accordance with the prior art.

FIG. **3** is an exploded perspective view of a pneumatically operated opener device in accordance with the preferred embodiment of the present invention.

FIG. **4** is a partially exploded perspective view of the pneumatically operated opener device as shown in FIG. **3**.

FIG. **5** is a partially exploded perspective view of the pneumatically operated opener device as shown in FIG. **3**.

FIG. **6** is a front cross-sectional view of the pneumatically operated opener device as shown in FIG. **3**.

FIG. **7** is a locally enlarged operational view of the pneumatically operated opener device as shown in FIG. **6**.

FIG. **8** is a locally enlarged operational view of the pneumatically operated opener device as shown in FIG. **6**.

FIG. **9** is a locally enlarged operational view of the pneumatically operated opener device as shown in FIG. **6**.

FIG. **10** is a locally enlarged operational view of the pneumatically operated opener device as shown in FIG. **9**.

FIG. **11** is a locally enlarged operational view of the pneumatically operated opener device as shown in FIG. **10**.

FIG. **12** is a front cross-sectional view of a pneumatically operated opener device in accordance with another preferred embodiment of the present invention.

FIG. **13** is a schematic operational view of the pneumatically operated opener device as shown in FIG. **12** in use.

FIG. **14** is a schematic operational view of the pneumatically operated opener device as shown in FIG. **13**.

FIG. **15** is a partially front cross-sectional view of a pneumatically operated opener device in accordance with another preferred embodiment of the present invention.

FIG. **16** is a front cross-sectional view of a pneumatically operated opener device in accordance with another preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the drawings and initially to FIGS. **3-6**, a pneumatically operated opener device in accordance with the preferred embodiment of the present invention comprises a holding unit **30**, an air valve unit **31**, an air injection unit **32**, and a mounting member **33**.

The holding unit **30** includes a hollow grip **301**, and a high pressure nitrogen bottle **302** mounted in the hollow grip **301**. The hollow grip **301** has an end provided with an internal thread **3011** for combining the air valve unit **31**.

The air valve unit **31** includes a valve seat **310**, a retaining ring **311**, a washer **312**, and a compressed nozzle module **313**. The valve seat **310** has a first end provided with a protruding threaded post **3105**. The valve seat **310** has a second end provided with a threaded recess **3106** for mounting the compressed nozzle module **313**. The valve seat **310** has a periphery provided with a threaded groove **3107**. The compressed nozzle module **313** includes an air inlet nozzle **3130**, a thrust rod **3131**, an O-ring **3132**, and a knob **3133**. The knob **3133** has an outer thread that is screwed into the

threaded recess **3106** of the valve seat **310**. The air inlet nozzle **3130** is connected to an air outlet terminal of the high pressure nitrogen bottle **302**. The thrust rod **3131** is movably mounted in the knob **3133** and abuts the air inlet nozzle **3130**. The O-ring **3132** is located between the thrust rod **3131** and the knob **3133**.

The air injection unit **32** includes a hollow air duct **321**, a hollow push rod **3213**, a spring **3216**, and an air injecting needle **3214**. The hollow air duct **321** has an upper end provided with a protruding threaded post **3211** screwed into the threaded groove **3107** of the valve seat **310**, and an O-ring **3210** is located between the threaded post **3211** of the hollow air duct **321** and the threaded groove **3107** of the valve seat **310**. The hollow air duct **321** has a lower end provided with an inner thread **3212** for screwing a threaded upper end of the hollow push rod **3213**, and an O-ring **3215** is located between the hollow push rod **3213** and the inner thread **3212** of the hollow air duct **321**. The spring **3216** is mounted on the hollow push rod **3213**. The air injecting needle **3214** has a threaded upper end screwed into a threaded lower end of the hollow push rod **3213**, and an O-ring **3217** is located between the threaded upper end of the air injecting needle **3214** and the threaded lower end of the hollow push rod **3213**.

The mounting member **33** is a cylindrical sleeve and has an upper end provided with a through hole **331** and a passage **332** and a lower end provided with a hollow slot **333**. The passage **332** of the mounting member **33** is connected between the through hole **331** and the hollow slot **333**. The hollow push rod **3213** of the air injection unit **32** is in turn extended through the passage **332** and the through hole **331** of the mounting member **33** and is then connected with the inner thread **3212** of the hollow air duct **321**.

In assembly, again referring to FIGS. **3-6**, the air inlet nozzle **3130**, the thrust rod **3131**, the O-ring **3132** and the knob **3133** are assembled to construct the compressed nozzle module **313**. Then, the knob **3133** is screwed into the threaded recess **3106** of the valve seat **310** so that the compressed nozzle module **313** is mounted on the valve seat **310**. Then, the retaining ring **311** and the washer **312** are placed into the threaded post **3105** of the valve seat **310**, so that the air valve unit **31** is assembled. Then, the air outlet terminal of the high pressure nitrogen bottle **302** is directed toward and connected to the air inlet nozzle **3130**, and the internal thread **3011** of the hollow grip **301** is screwed into the threaded post **3105** of the valve seat **310**, so that the holding unit **30** is combined with the air valve unit **31**. Then, the threaded upper end of the air injecting needle **3214** is screwed into the threaded lower end of the hollow push rod **3213**, with the O-ring **3217** being located between the threaded upper end of the air injecting needle **3214** and the threaded lower end of the hollow push rod **3213**. Then, the spring **3216** is mounted on the hollow push rod **3213**. Then, the hollow push rod **3213** of the air injection unit **32** is in turn extended through the hollow slot **333**, the passage **332** and the through hole **331** of the mounting member **33**. Then, the threaded upper end of the hollow push rod **3213** is screwed into the inner thread **3212** of the hollow air duct **321** so that the hollow push rod **3213** is connected with the hollow air duct **321**. At this time, the O-ring **3215** is located between the hollow push rod **3213** and the inner thread **3212** of the hollow air duct **321**, and the spring **3216** is biased between the hollow push rod **3213** and the mounting member **33**. In such a manner, the hollow push rod **3213** is driven by the hollow air duct **321** to move relative to the mounting member **33**. Thus, the hollow push rod **3213** is movable in the passage **332** and the through hole **331** of the mounting member **33**, and the air injecting needle **3214** is movable in the hollow slot **333** of the mounting member **33**.

In practice, referring to FIG. **7** with reference to FIGS. **3-6**, when the thrust rod **3131** is pressed inward in the knob **3133**, the thrust rod **3131** is moved to press the air outlet terminal of the high pressure nitrogen bottle **302** so as to open the high pressure nitrogen bottle **302** so that the nitrogen in the high pressure nitrogen bottle **302** is released and flows through the air inlet nozzle **3130**, the hollow air duct **321**, the hollow push rod **3213** and the air injecting needle **3214** and is injected outward from the air injecting needle **3214**.

In operation, referring to FIGS. **8-11** with reference to FIGS. **3-6**, the hollow slot **333** of the mounting member **33** is mounted on a wine bottle **4**. Then, the hollow grip **301** is pulled by the user to move upward relative to the mounting member **33** to move the hollow push rod **3213** and the air injecting needle **3214** upward relative to the mounting member **33**. At this time, the spring **3216** is compressed to store a restoring force. After the force applied on the hollow grip **301** disappears, the hollow grip **301** is forced by the restoring force of the spring **3216** to move toward the mounting member **33**, while the hollow push rod **3213** and the air injecting needle **3214** are moved downward relative to the mounting member **33**, so that the air injecting needle **3214** is lowered to pierce the cork **41** of the wine bottle **4** as shown in FIG. **8**. After the air injecting needle **3214** penetrates the cork **41** of the wine bottle **4**, the thrust rod **3131** is pressed inward by the user, to drive the air inlet nozzle **3130** which is moved to press the air outlet terminal of the high pressure nitrogen bottle **302** so as to open the high pressure nitrogen bottle **302** so that the nitrogen in the high pressure nitrogen bottle **302** is released and in turn flows through the air inlet nozzle **3130**, the hollow air duct **321**, the hollow push rod **3213** and the air injecting needle **3214**, and is then injected outward from the air injecting needle **3214** into the wine bottle **4** as shown in FIG. **9**. After the nitrogen is filled with the wine bottle **4**, the nitrogen produces a greater pressure which pushes the cork **41** upward gradually until the cork **41** is detached from the mouth of the wine bottle **4** as shown in FIG. **10** so as to open the wine bottle **4**. Then, the mounting member **33** is removed from the wine bottle **4**. Then, the hollow grip **301** is pulled upward relative to the mounting member **33** to move the hollow push rod **3213** and the air injecting needle **3214** upward relative to the mounting member **33** so as to move the cork **41** upward. When the cork **41** abuts the top wall of the hollow slot **333**, the cork **41** stops moving, while the hollow push rod **3213** and the air injecting needle **3214** keeps moving upward, so that the cork **41** is detached from the air injecting needle **3214** as shown in FIG. **11**. In such a manner, the cork **41** is removed from the mounting member **33** easily and quickly and will not be deformed or broken so as to maintain the shape of the cork **41**.

Referring to FIGS. **12-14**, the pneumatically operated opener device further comprises a gas injection tube **34** connected with the valve seat **310** of the air valve unit **31**. The gas injection tube **34** has a conical shape and has a first end provided with a gas injection hole **341** and a second end provided with an outer thread screwed into the threaded groove **3107** of the valve seat **310**. The gas injection tube **34** is inserted into the wine bottle **4**. Then, the thrust rod **3131** is pressed inward by the user, to drive the air inlet nozzle **3130** which is moved to press the air outlet terminal of the high pressure nitrogen bottle **302** so as to open the high pressure nitrogen bottle **302** so that the nitrogen in the high pressure nitrogen bottle **302** is released and in turn flows

through the air inlet nozzle **3130** and the gas injection hole **341** of the gas injection tube **34** into the wine bottle **4** as shown in FIG. **13**. Then, the cork **41** is mounted on the wine bottle **4** as shown in FIG. **14**. In such a manner, the nitrogen isolates and prevents the liquid in the wine bottle **4** from touching oxygen in the air to provide an anti-oxidation effect so as to enhance the conservation period of the wine.

Referring to FIG. **15**, the mounting member **33** has an outer edge provided with a groove **334** for mounting an opener **5** to prevent the opener **5** from being lost.

Referring to FIG. **16**, a cap **3134** is screwed onto the thrust rod **3131** and mounted on the knob **3133** to cover the thrust rod **3131** and the knob **3133**.

Accordingly, the cork **41** is pushed upward by the thrust force of the nitrogen from the high pressure nitrogen bottle **302** and is detached from the wine bottle **4** smoothly so that the cork **41** will not be deformed or broken and will not produce chips during the opening process to prevent the chips from falling into the wine bottle **4**. In addition, the air injecting needle **3214** is received in the hollow slot **333** of the mounting member **33** when not in use to prevent the air injecting needle **3214** from injuring or hurting the user unintentionally. Further, the nitrogen isolates and prevents the liquid in the wine bottle **4** from touching oxygen in the air so as to enhance the storage life of the wine.

Although the invention has been explained in relation to its preferred embodiment(s) as mentioned above, it is to be understood that many other possible modifications and variations can be made without departing from the scope of the present invention. It is, therefore, contemplated that the appended claim or claims will cover such modifications and variations that fall within the true scope of the invention.

The invention claimed is:

1. A pneumatically operated opener device comprising:

a holding unit, an air valve unit, an air injection unit, and a mounting member; wherein:

the holding unit includes a hollow grip and a high pressure nitrogen bottle mounted in the hollow grip;

the air valve unit includes a valve seat and a compressed nozzle module mounted on the valve seat;

the air injection unit includes a hollow air duct, a hollow push rod mounted on a lower end of the hollow air duct, and an air injecting needle mounted on a lower end of the hollow push rod;

the mounting member is a cylindrical sleeve;

the mounting member has an interior provided with a through hole;

the hollow push rod of the air injection unit is extended through the through hole of the mounting member and connected with the hollow air duct; and

the mounting member has a lower end provided with a hollow slot.

2. The pneumatically operated opener device of claim **1**, wherein the high pressure nitrogen bottle is located outside of the hollow grip.

3. The pneumatically operated opener device of claim **1**, wherein the mounting member is a triangular cylindrical sleeve, a quadrangular cylindrical sleeve or a polygonal sleeve.

4. The pneumatically operated opener device of claim **1**, further comprising a gas injection tube connected with the valve seat of the air valve unit.

* * * * *